STUDIES ON *OLIVIDAE* : V.
FIVE ADDITIONAL PROTOCONCH CHARACTERS FOR *OLIVA* TAXONOMY.

B. TURSCH and L. GERMAIN

Collectif de Bio-Ecologie, Faculté des Sciences,
Université Libre de Bruxelles,
50, Av. F.D.Roosevelt, 1050 BRUSSELS, BELGIUM.

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MOTS CLEFS : *Gastropoda* - *Mollusca* - Morphométrie - *Oliva* - Protoconch.

ABSTRACT : Five novel protoconch measurements are defined. Their potential for *Oliva* taxonomy is evidenced.

RESUME : Cinq nouvelles mesures de protoconque sont définies. Leur potentiel pour la taxonomie du genre *Oliva* est mis en évidence.

1. INTRODUCTION.

A set of protoconch measurements has been previously defined (TURSCH & GERMAIN, 1985 and 1986a). Although these measurements have been shown to be consistent and reliable tools for *Oliva* taxonomy (TURSCH, GERMAIN & GREIFENEDER, 1986a and 1986b), they are not numerous enough to provide a sufficient description of such a complex shell feature as the protoconch. Some taxa have obviously different protoconchs and yet can not be separated with the limited set of protoconch measurements utilized so far.

As an example amongst many others, the protoconchs of *Oliva sihogae* and *Oliva tesselata* although quite different in aspect (see Fig.1), are not satisfactorily separated by any of the previously defined characters. This can be illustrated by the best available attempt, pictured in Fig.2, where two additional species (*O. fulgurator* and *O. kaleontina*) have been included to indicate the range of variation of characters in the genus *Oliva*. Additional protoconch characters could clearly be useful in such instances.

This paper does not aim at deriving taxonomical conclusions. Its only purpose is to define shell measurements and to test their potential as taxonomic characters.

2. METHODS.

2.1. The characters proposed here are directly measured on the same drawing that is necessary to provide the previously defined measurements RES4, RES5 and RES7 (for details see TURSCH & GERMAIN, 1986). For a quick reminder, the shell is placed with the protoconch to teleoconch transition facing the observer and with the sutural ramp of the whorl following the transition appearing as much as possible as a straight line. The drawing (Fig.3) is made through the camera lucida attachment of a binocular lens and a 1 mm. segment (precalibrated on the ocular reticulum) is also drawn as an internal length reference.

2.2. Let REF be the length of the internal 1 mm. reference segment included in the drawing. The distances LS, MN, MO and NP (see Fig.3.) are directly measured. One then measures the longest possible line RQ, orthogonal to MN. If the whorl profile is concave, the distance will have a negative value. The measurements PT14, PT15, PT16, PT17 and PT18 are defined as LS/REF, RQ/REF, MN/REF, MO/REF and NP/REF respectively.

2.3. For taxonomic applications, the measurements defined in section 2.2. can be utilized as such, if absolute size is the requested factor. If utilized in combination they will afford information on shape. For instance, some information about the convexity of the profile of penultimate protoconch whorl can be provided by the variable W = (PT15+PT16)/PT16.

3. MATERIAL.

AM stands for specimens from the Instituut voor Taxonomische Zoologie, Amsterdam University (numbered by B.T.); RM for specimens from the R.Martin (Cebu) collection; BT for specimens from the B.Tursch collection.

Oliva sibogae Petuch and Sargent, 1986 : specimens RM-017 (Cebu, Philippines), BT-4928, BT-4929, BT-4930, BT-4931 (all from Hansa Bay, Papua New Guinea). The name *O.sibogae* has been introduced by Petuch and Sargent as a new name for the well known *O. dubia* Schepman, 1911, preoccupied by the fossil *O. dubia* Lea,1833.

Oliva fulgurator Röding, 1798 : specimens AM-001 (Venezuela), AM-010, AM-011, AM-33 (all from Aruba) and BT-3420 (Aruba).

Oliva kaleontina Duclos, 1835 : specimens BT-4255 (Galapagos Is.), BT-3751, BT-3752, BT-3753 and BT-3756 (all from Western Panama).

Oliva tesselata Lamarck, 1811 : specimens BT-4508, BT-4509, BT-4510, BT-4511 and BT-4512 (all from Sulu Sea, Philippines).

4. RESULTS.

The two species *O.silogae* and *O.tesselata* can not be separated on the sole basis of the previously defined protoconch characters (see Fig.2). The use of the novel characters PT14, PT15, PT16, PT17 and PT18 allows a complete, unambiguous separation of the test sample, as evidenced by the scatter diagrams of PT14 versus PT15 (Fig.4) or PT16 versus PT18 (Fig.5).
A similar result is obtained with the scatter diagram of PT17 versus the composite variable W = (PT15+PT16)/PT16 (Fig.6).

5. DISCUSSION.

5.1. Addition of the newly defined PT14, PT15, PT16, PT17 and PT18 to the previously defined protoconch characters is very fast and easy, as it entails only direct length measurements on an already existing drawing.

5.2. The reader will have noticed that the suggested measurements are completely empirical and were not justified by geometrical considerations. Such a justification is indeed unnecessary as it has been long ago demonstrated that similarity measurements can be successfully achieved even on undetermined, random characters (ROHLF & SOKAL, 1967). The taxonomic structure obtained in this way compares favourably with the structure obtained from selected, scored characters (SNEATH & SOKAL, 1973, p.87).

5.3. Application of the measurements proposed here is not restricted to the solution of individual cases such as the one illustrated hereabove. Preliminary tests indicate that these characters can be of general use in the genus *Oliva* (and possibly in many other Gastropod groups).

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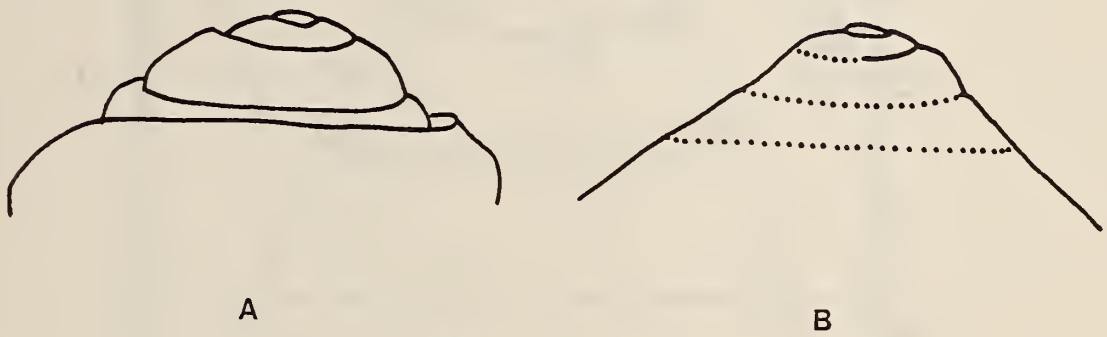

FIG. 1

Protoconchs of *Oliva sihogae* (A, specimen BT-4929) and *Oliva tesselata* (B, specimen BT-4511).

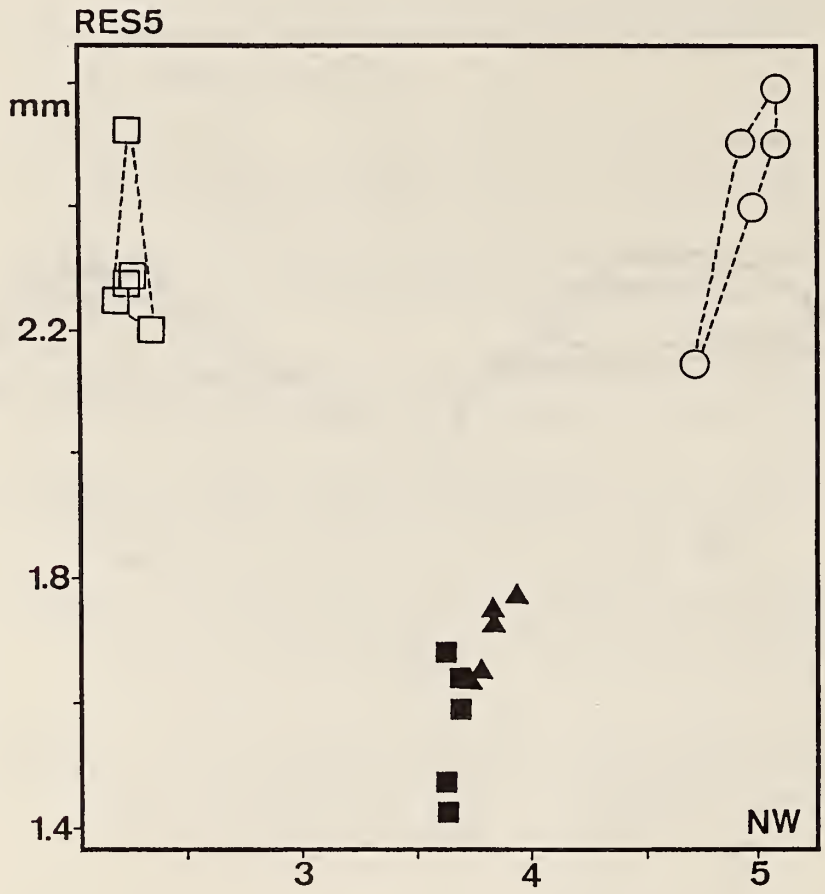

FIG. 2

Attempted separation of *Oliva sihogae* from *Oliva tesselata*. Scatter diagram of NW vs RES5. Black triangles represent *Oliva sihogae*, black squares *Oliva tesselata*, white squares *Oliva fulgurator* and white circles *Oliva kaleontina*.

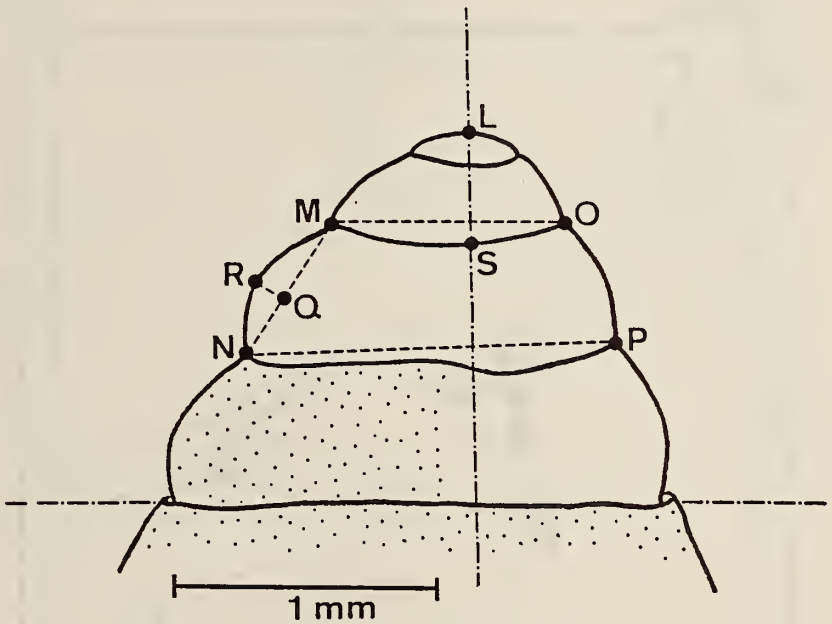

FIG. 3

Protoconch measurements.

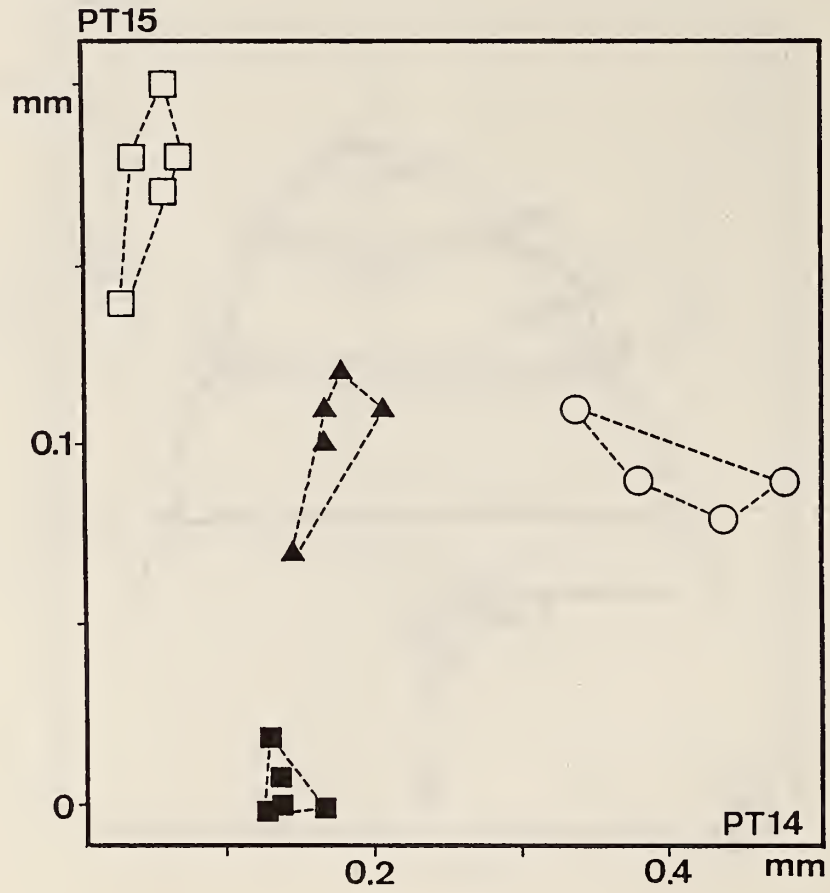

FIG. 4

Separation of *Oliva sibogae* from *Oliva tesselata*. Scatter diagram of PT14 vs PT15. Black triangles represent *Oliva sibogae*, black squares *Oliva tesselata*, white squares *Oliva fulgurator* and white circles *Oliva kaleontina*.

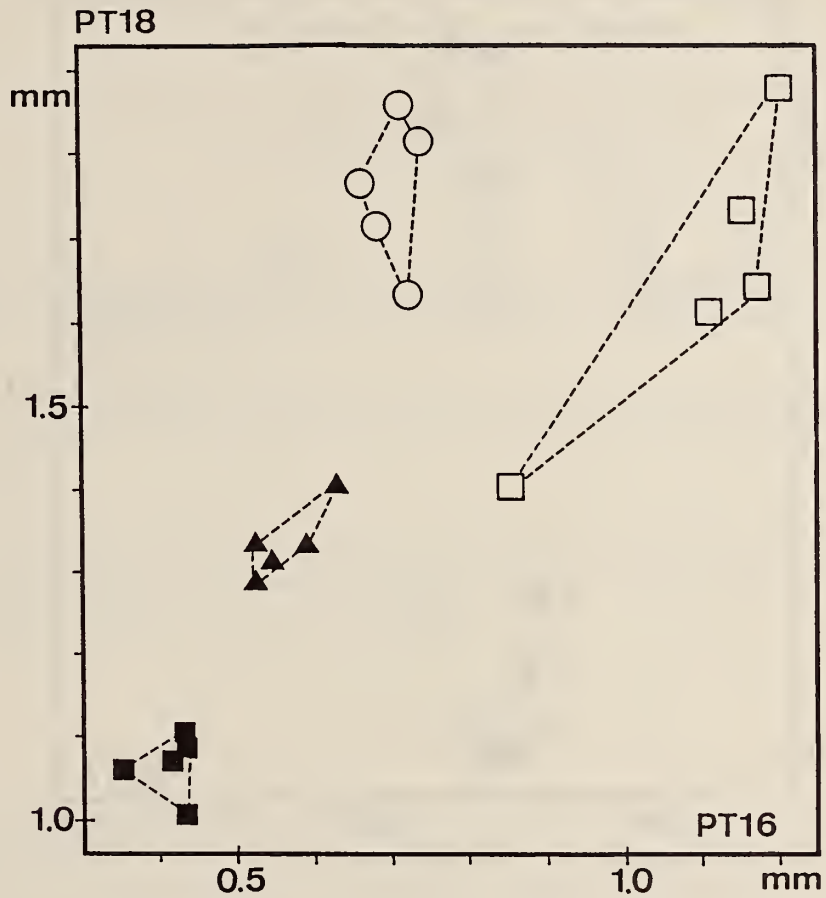

FIG. 5

Separation of *Oliva sihogae* from *Oliva tesselata*. Scatter diagram of PT16 vs PT18. Black triangles represent *Oliva sihogae*, black squares *Oliva tesselata*, white squares *Oliva fulgurator* and white circles *Oliva kaleontina*.

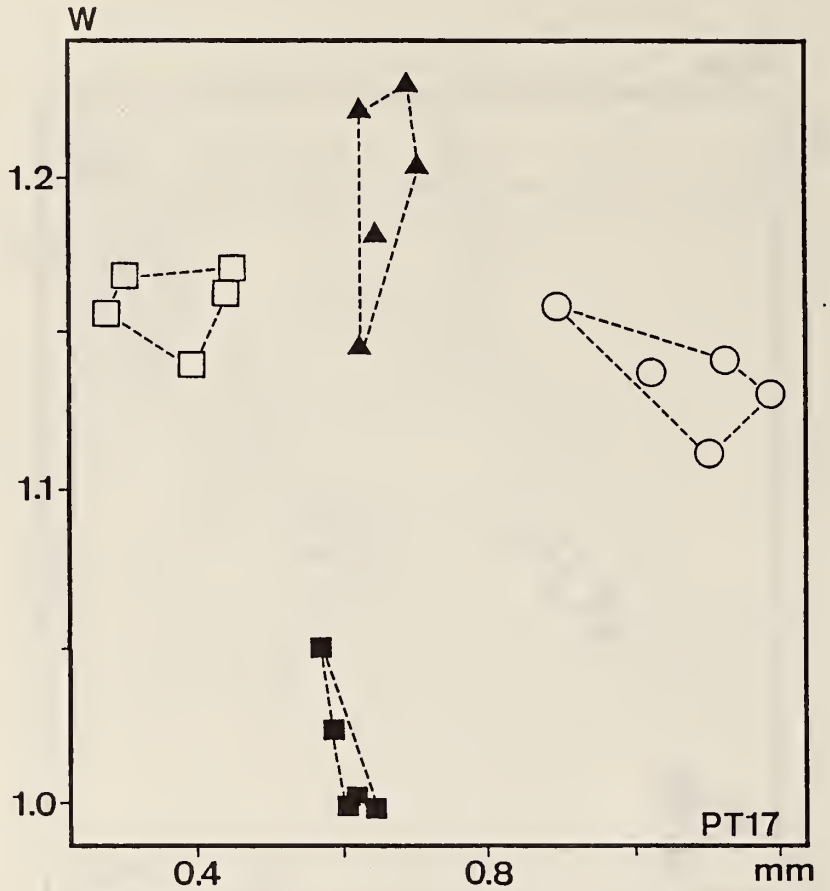

FIG. 6

Separation of *Oliva sihogae* from *Oliva tesselata*. Scatter diagram of PT17 vs W. W stands for (PT15+PT16)/PT16. Black triangles represent *Oliva sihogae*, black squares *Oliva tesselata*, white squares *Oliva fulgurator* and white circles *Oliva kaleontina*.